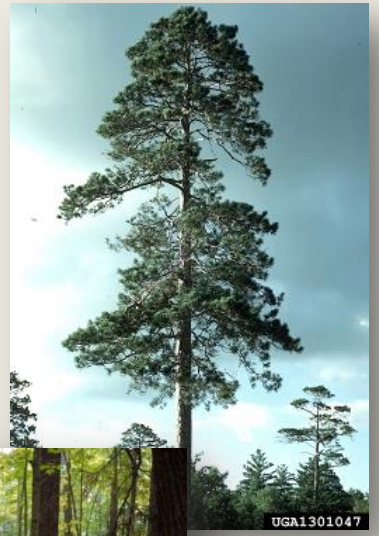
Eastern white pine

(*Pinus strobus)*



White pine is one of the **largest and most long-living tree species** in Wisconsin. It was once a very significant component of our northern forests but most large trees were harvested during the Cutover at the turn of the century. Today, fortunately, white pine is making a comeback.

The white pine resource has **more than doubled in volume** in the last two decades**.** The number of trees in all size classes has increased significantly indicating that white pine should remain a major species in future forests.

Growth rates are high and increasing. Mortality rates have also increased but are still quite low. For instance, white pine accounts for 7.7% of all volume in trees in Wisconsin, 12% of growth but **only 1.4% of total mortality**.

In 2009, white pine made up 3.6% of roundwood production and is mainly used for pulpwood and sawlogs. The density of white pine wood is very low making it a less desirable species for biomass production.

- *How has the white pine resource changed?*
  Volume and diameter class distribution: 1983, 1996, and 2012
- *Where does white pine grow in Wisconsin?*
  Growing stock volume by region with map
- *How fast is white pine growing?*
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"How has the white pine resource changed?"

Growing stock volume and diameter class distribution by year

The growing stock volume of white pine in Wisconsin in 2012 was almost 1.7 billion cft or about 7.7% of total statewide volume (Chart 1). **White pine volume has almost tripled since 1983 and has increased 55% since 1996**. Volume in all size classes has increased about equally (Chart 2).

The **numbers of trees in almost all size classes has increased** significantly (Chart 3), including a doubling in the number of saplings. This indicates that white pine will probably play a very significant role in future forests of Wisconsin.

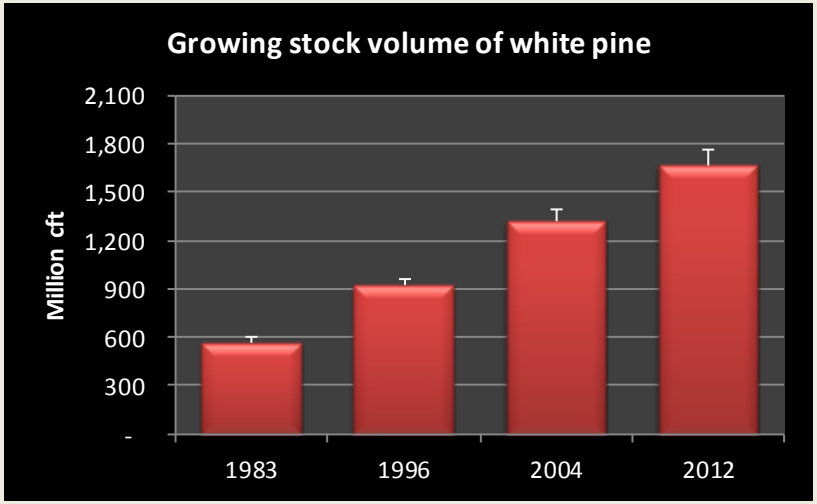


Chart 1. Growing stock volume (million cubic feet) by inventory year.
Source: USDA Forest Inventory and Analysis data: 1983, 1996, and 2012.

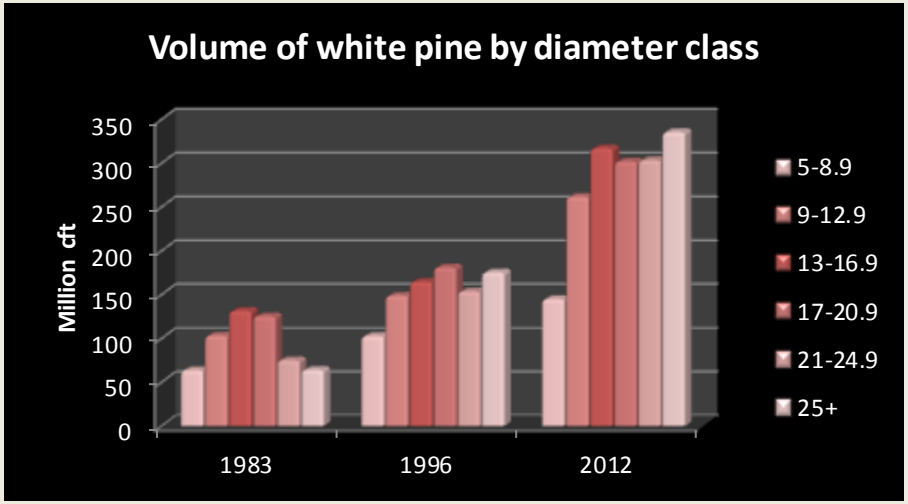


Chart 2. Growing stock volume (million cubic feet) in 1983, 1996, and 2012.
Source: USDA Forest Inventory and Analysis data: 1983, 1996, and 2012.

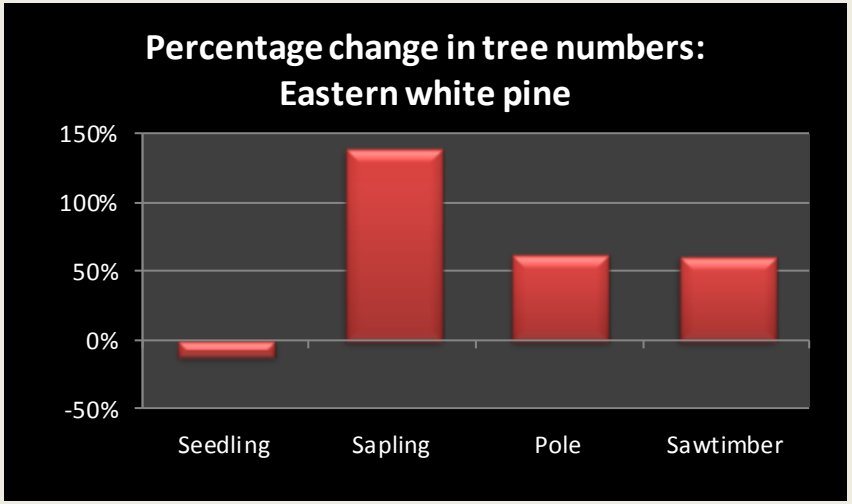
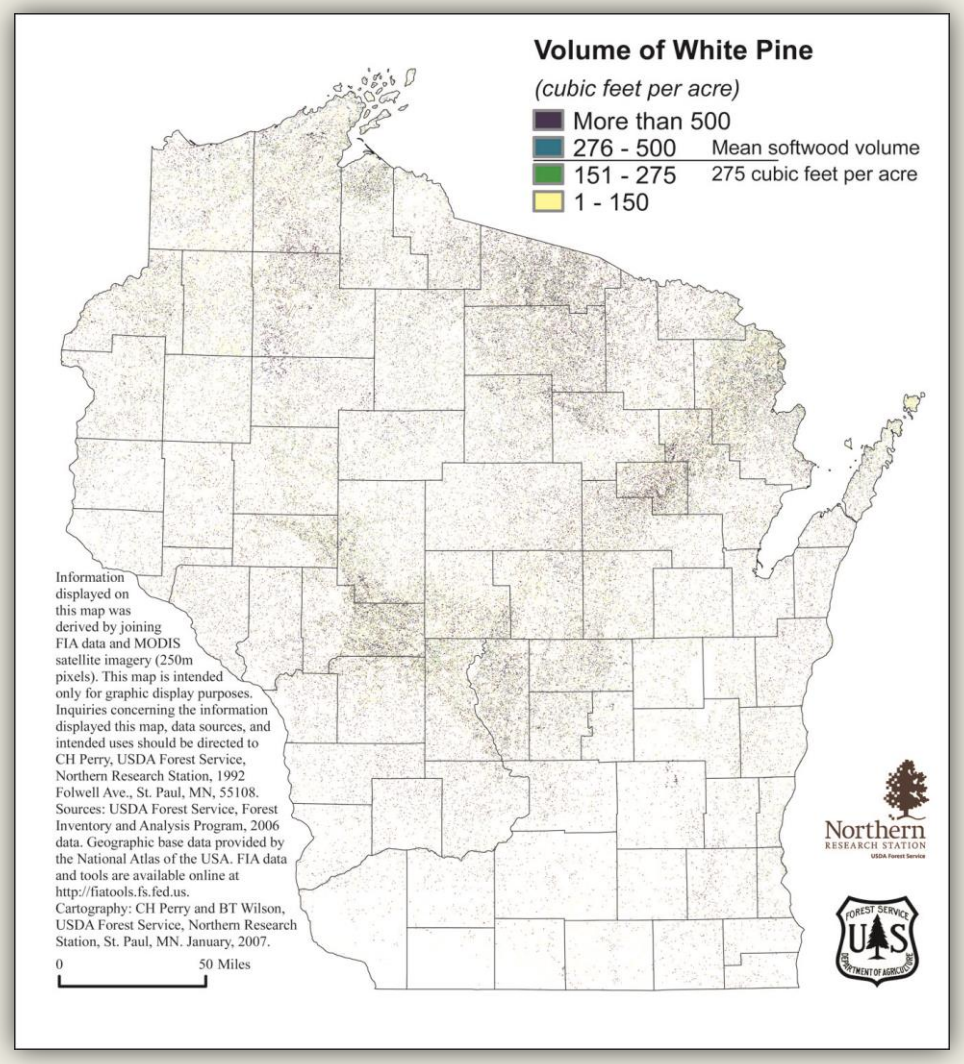


Chart 3. Percentage change in the number of live trees by size class between 1996 and 2012.
Source: USDA Forest Inventory and Analysis data 1996, and 2012.

"Where does white pine grow in Wisconsin?"

Growing stock volume by region with map



Eastern white pine is a common species in northern and central forests (Table 1).

In addition to the pine forest types, white pine is typically found in combination with hardwoods in the oak-hickory, oak-pine, aspen-birch and maple-basswood forest types.

Table 1. Growing stock volume (million cft) by species and region of the state.

Species	Central	North east	North west	South east	South west	Total
White Pine	504	577	377	87	122	**1,667**
Percent of total	**30%**	**35%**	**23%**	**5%**	**7%**	**100%**

Source: USDA Forest Service, Forest Inventory and Analysis 2012 data

For a table on **Volume by County for 2012** go to:
http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/VolumeCountySpecies.pdf

"How fast is white pine growing?"

Average annual net growth by region and year

Average annual net growth of eastern white pine was about 68.7 million cft/yr between 2008 and 2012, representing 12% of statewide volume growth (Chart 4). Growth rates have increased significantly in the last three decades, quadrupling since 1983.

Table 2. Average annual net growth (million cft/year) of growing stock and the ratio of growth to volume by region of the state.

Region	Net growth	Percent of Total	Ratio of growth to volume
Central	24.0	35%	**4.8%**
Northeast	20.8	30%	**3.6%**
Northwest	11.2	16%	**3.0%**
Southeast	5.3	8%	**6.1%**
Southwest	7.5	11%	**6.1%**
Statewide	**68.7**	**100%**	**4.1%**

Source: USDA Forest Inventory and Analysis 2012

Chart 4. Average annual net growth (million cubic feet).
Source: USDA Forest Inventory & Analysis data: 1983, 1996, 2012

Volume growth of white pine is highest in central and northeastern Wisconsin but growth rates are highest in the south (Table 2).

The average statewide ratio for white pine is 4.1%, higher than the statewide average of 2.6% for all species.

For a table of **Average annual growth, mortality and removals by region** go to:
http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/GrowthMortalityRemovals.pdf

"How healthy is white pine in Wisconsin?"

Average annual mortality: 1983, 1996, and 2012

Average annual mortality of white pine, about 3.4 million cft per year from 2008 to 2012, has decreased 11% since 1996 (Chart 5). White pine accounts for 7.7% of total growing stock volume in the state but only 1.5% of total mortality.

The ratio of mortality to gross growth is 4.8% for white pine, **much lower than the statewide average** of 29.1%.

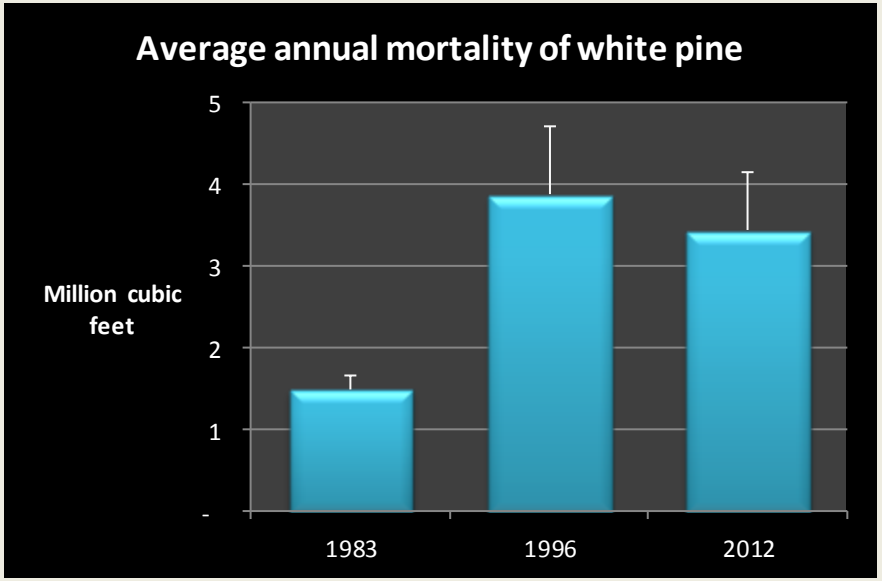


Chart 5. Average annual mortality (million cubic feet) by inventory year.
Source: USDA Forest Inventory & Analysis data: 1983, 1996, and 2012

Table 3. Mortality, gross growth and the ratio of mortality to gross growth.

Species	Average annual mortality (cft)	Average annual gross growth (cft)	Mortality / growth
Eastern White Pine	3,434,489	72,117,799	**4.8%**

Source: USDA Forest Inventory & Analysis data: 2012

For a table of **Average annual growth, mortality and removals by region** go to:
http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/GrowthMortalityRemovals.pdf

"How much white pine do we harvest?"

Roundwood production by product and year

In 2009, white pine roundwood accounted for 13.2 million cft or about 3.6% of Wisconsin's total production, an increase of 21% over 2003. About 60% is in pulpwood and 22% in sawlogs and veneer (Chart 6).

From 2003 to 2009, pulpwood production increased by 62%. White pine supplies 7.6 million cft or 4.6% of total pulpwood production.

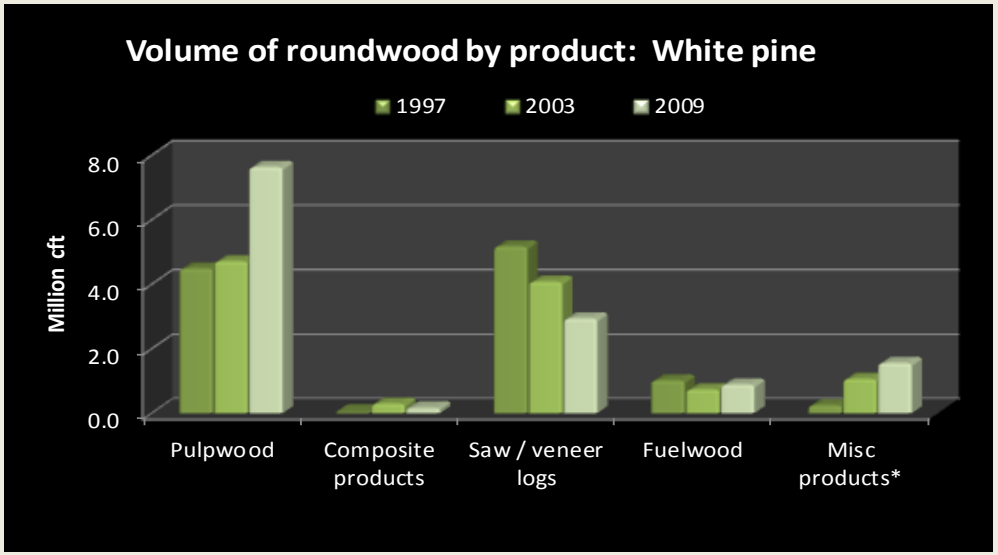


Chart 6. Volume of roundwood products. * Miscellaneous products include poles, posts, and pilings.
Source: Ronald Piva, USDA Forest Service, Northern Research Station, St. Paul MN

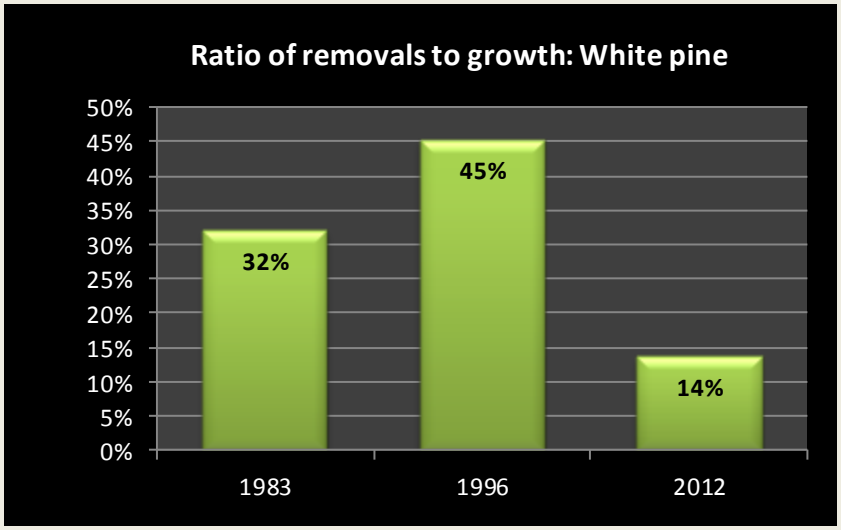


Chart 7. Ratio of volume harvested annually to net growth.
Source: USDA Forest Inventory & Analysis data: 1983, 1996, and 2012.

The ratio of removals to growth for eastern white pine was 14% for 2008 to 2012, less than half the average ratio of 55.1% for all species.

The ratio of growth to removals has fallen 31% from 1996. This change may be accounted for by a decrease of 31% in removals as well as a doubling in the growth rate. Removals were 9.4 million cft.

For a table of **Average annual growth, mortality and removals by region** go to:
http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/GrowthMortalityRemovals.pdf

"How much is white pine selling for?"

Prices for cordwood & sawtimber: 2000 to present

Due to the variability of timber prices from year to year and region to region, two methods of reporting prices are presented here: Timber Mart North and average weighted stumpage prices from Wisconsin Administrative Code Chapter NR 46.

Stumpage prices for sawtimber, as reported in the Timber Mart North (Chart 8), have increased about 13% since 2002. Delivered sawlogs, on the other hand, have decreased in price by 33% since 2002.

Average weighted stumpage values, as reported in NR46 (Table 4), peaked in 2005 and have fallen since.

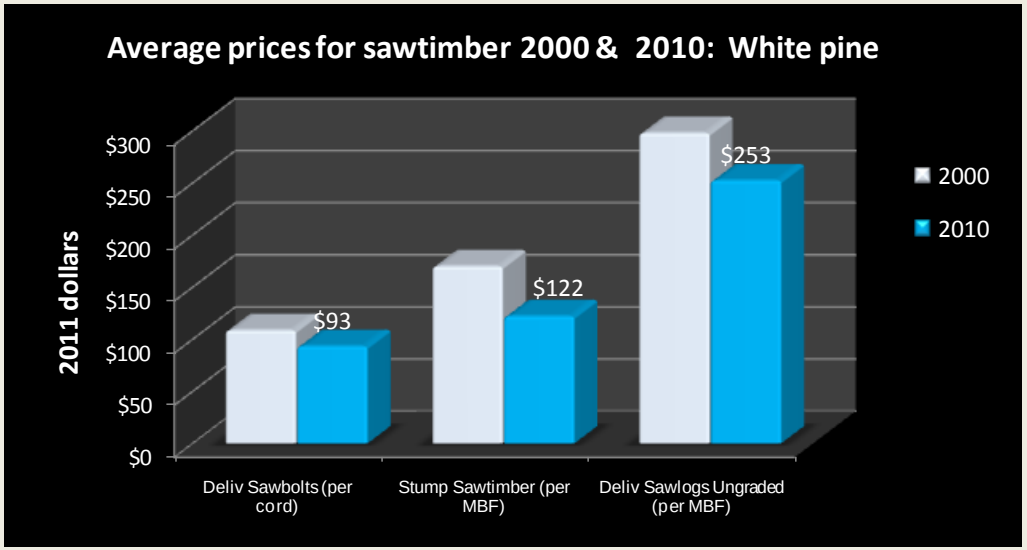


Chart 8. Average prices for cordwood and sawtimber (2008).
Source: Timber Mart North, George Banzhaf & Company, 8301 N. Allen Lane, Milwaukee, WI 53217

Table 4. Average weighted stumpage prices (adjusted for inflation to 2012 dollars) by year for Wisconsin.

Product	2002	2003	2004	2005	2006	2007	2008	2009	2010	2012	Average for all softwoods
Cordwood (per cord)	$31	$32	$34	$34	$29	$26	$21	$22	$22	**$28**	$30
Logs (per MBF)	$146	$172	$169	$185	$162	$154	$126	$122	$119	**$125**	$103

Source: Wisconsin Administrative Code Chapter NR46, 2002 to 2012. The stumpage values calculated each year are for the sole purpose of assessing MFL yield and FCL severance taxes, not for determining the price that should be received for timber.

"How much white pine biomass do we have?"

Aboveground carbon by region of the state

There were 29.3 million tons of aboveground biomass in live white pine trees in 2012, an increase of 177% from 1983. This is equivalent to approximately 14.6 million tons of carbon and represents 4.7% of all aboveground biomass statewide. As with volume, most white pine is located in northeast and central Wisconsin (Chart 9).

The density of white pine wood is fairly low with a ratio of biomass to volume of only 32.5 oven-dry lbs. per cubic foot (ODP/cft). The average for all softwoods is about 34.3 ODP/cft and for all species is 50.1 ODP/cft.

Over 82% of all white pine biomass is located in the main stem and 14% in the branches.

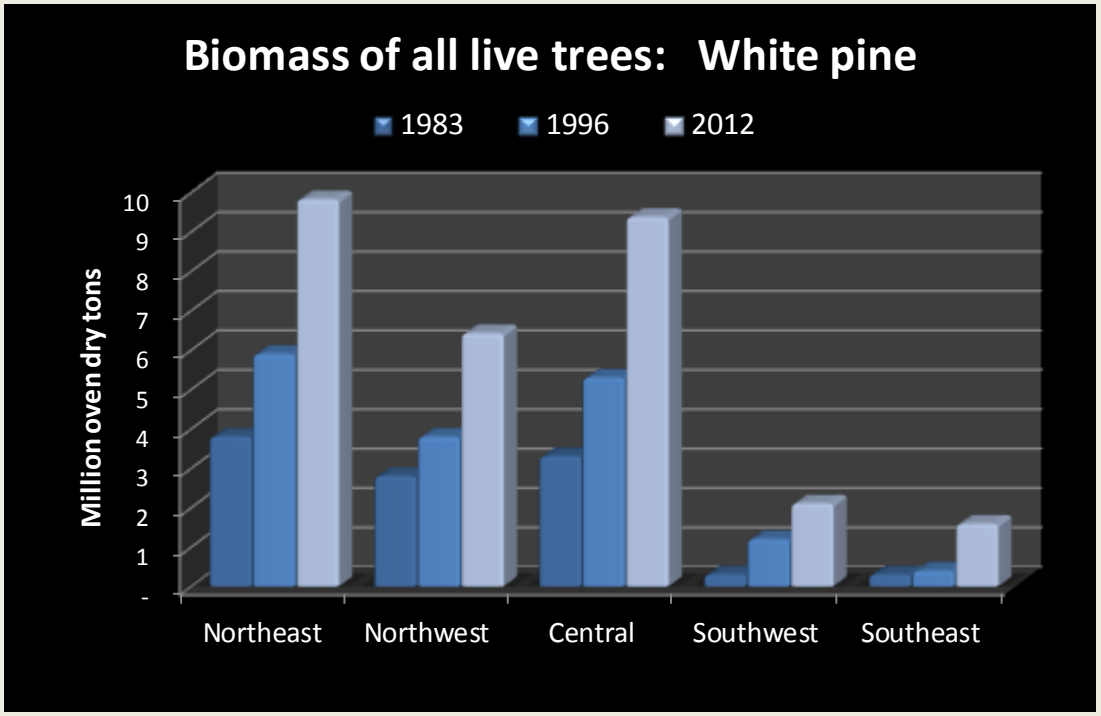


Chart 9. Biomass (above ground dry weight of live trees >1 in dbh, short tons) by year and region of the state.
Source: USDA Forest Inventory & Analysis data: 1983, 1996, and 2012

For a table of **Biomass by County for 2012** go to:
http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/BiomassByCounty.pdf